REMARKS/ARGUMENTS

Reconsideration and allowance of this application are respectfully requested. Currently, claims 1-11, 13-25 and 27-28 are pending in this application.

Premature Finality of Office Action:

The finality of the outstanding Office Action is premature. In Applicant's May 27, 2005 Amendment/Response, claims 1 and 15 were amended to include the limitations of (canceled) claims 12 and 26, respectively. Claims 12 and 26 were merely objected to in the first Office Action mailed February 28, 2005, and were not rejected. Indeed, the first Office Action indicated that these claims would be allowable if rewritten in independent form. The outstanding "final" Office Action thus rejects the subject matter presented by claims 12 and 26 (i.e., previously amended claims 1 and 15) for the very first time.

Allowable Subject Matter:

Claims 6-7 and 20-21 are allowable.

The Office Action indicated that claims 2-5, 8-11, 13-14, 16-19, 22-25 and 27-28 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. By this Amendment, claims 2 and 4 have been rewritten in independent form to include the limitations of original claim 1, and claims 16 and 18 have been rewritten in independent form including the limitations of original claim 15. Since the first Office Action mailed February 28, 2005 merely objected to these claims as being dependent upon a rejected claim, but otherwise indicated that these claims would be allowable if rewritten in independent form, claims 2 and 4 have been rewritten in

independent form to include the limitations of claim 1, but without the limitations required by claim 12 (i.e., without "wherein the obtained data relating to service conditions at each of the different surface locations is one or more of the following types of data: surface roughness, surface condition type, and severity of the surface condition."). For similar reasons, claims 16 and 18 have been rewritten in independent form to include the limitations of claim 15 but without the limitations of claim 26 (i.e., without "wherein the received data relating to service conditions at each of the different surface locations is one or more of the following types of data: surface roughness, surface condition type, and severity of the surface condition.").

Accordingly, claims 2, 4, 16 and 18 and their respective dependents are allowable.

Rejection Under 35 U.S.C. §102:

Claims 1 and 15 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Nirmalan et al (U.S. '743, hereinafter "Nirmalan"). Applicant respectfully traverses this rejection.

For a reference to anticipate a claim, each element must be found, either expressly or under principles of inherency, in the reference. Each element required by claims 1 and 15 is not found in Nirmalan. For example, Nirmalan fails to disclose "wherein the obtained data relating to surface conditions at each of the different surface locations is data relating to surface roughness (emphasis added)," as required by claims 1 and 15. In contrast to surface roughness data, Nirmalan merely discloses obtaining temperature data with an infrared thermal imaging system. (See, e.g., col. 5, lines 4-6 of Nirmalan).

Moreover, Nirmalan further fails to disclose "calculating the total profile efficiency loss for the turbine component based on the data relating to the respective

surface conditions at the different surface locations," as required by independent claim 1. Similarly, Nirmalan fails to disclose "a processor that calculates the total profile efficiency loss for the turbine component based on the data relating to the respective surface conditions at the different surface locations (emphasis added)," as required by independent claim 15.

Section 2 (page 2) of the Office Action apparently alleges that col. 5, lines 39-67 of Nirmalan discloses the above noted limitations. Applicant respectfully disagrees. Col. 5, lines 39-67 of Nirmalan is reproduced below:

> "Data corresponding to the change in temperature over time for each pixel of the structure is utilized to estimate one or more heat transfer characteristics. The heat transfer characteristic may then be used directly or subsequently manipulated to provide information useful in assessing the heat transfer quality of the structure. For example, an internal convective heat transfer coefficient (h) may be determined at each pixel location by modeling the thermal response in accordance with the present invention. Each pixel of data has the transient heat balance equation (1) applied as follows:
>
> $$\rho C_p t_h \Delta x^2 \Delta T_{m,t} / \Delta t = h \Delta x^2 (T_m - T_c) + k_m \Delta x t_h \sum (\Delta T_{m,x} / \Delta x)$$
>
> The nomenclature in equation (1) are normally defined as follows: ρ--airfoil material density; C_p--airfoil material specific heat; h--convective heat transfer coefficient; k--airfoil material thermal conductivity; T_c--temperature of air flowing through airfoil; t_h--airfoil surface wall thickness; T_m--airfoil surface temperature; $T_{m,x}$--temperature difference between adjacent pixels of the same frame; $T_{m,t}$--temperature difference of same pixel between subsequent frames; Δt--refers to time difference between subsequent frames; and, Δx--discrete pixel width. The energy balance considers convective heat transfer from the pixel to the cooling air flowing through the airfoil, energy storage within a pixel-sized mass 51_a (FIG. 5) of thickness t_h and conduction to/from the four adjacent pixels $51_{b\text{-}e}$. In one form of the present invention the term 'pseudo-heat transfer coefficient' is used because the actual thickness at each pixel is unknown."

While this portion of Nirmalan discloses "assessing the heat transfer quality of the structure", there is no disclosure or suggestion of calculating a total profile efficiency loss

for a turbine component based on surface condition data at different surface locations. As described in, for example, paragraph [0022] of the originally-filed specification, a total profile efficiency loss of a turbine component is produced as a result of its deteriorated surface conditions. The type(s) of the deteriorated surface condition(s) of a particular surface location of a turbine component or sub-areas of a particular surface location may be, for example, one of the following: new machining marks, codings, deposits, solid particle erosions, grit blast cleaning, small particle impingement, foreign object damage, water erosion and corrosion pitting. This deterioration in surface conditions results in an increased friction loss that is suffered by the steam path as it proceeds through the turbine. The increased friction loss degrades the efficiency of the component, and thus the turbine experiences a decrease in turbine thermal performance. The frictional loss caused by the deteriorated surface conditions is part of a total profile loss of that component and thus adversely affects the total profile efficiency.

In contrast, Nirmalan's system has the single focus of determining a heat transfer performance of a cooling scheme that is used to actively cool a particular turbine component. Nirmalan's system thus determines how well a turbine component is being cooled to keep its temperature within design limits. Nirmalan measures temperatures of various grid points located on the surface of a blade (see, e.g., Fig. 4) using an infrared thermal imaging system. This data is processed to indicate whether various modes of heat transfer used in the design of the cooling system are working in a fashion consistent with the design assumptions and objectives. Accordingly, Nirmalan fails to disclose calculating a total profile efficiency loss.

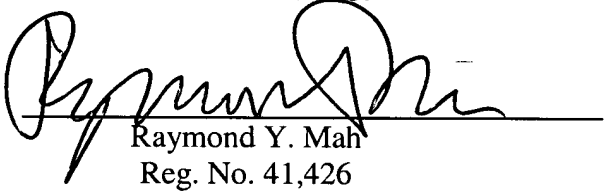
Accordingly, Applicant respectfully submits that claims 1 and 15 are not anticipated by Nirmalan and respectfully requests that the rejection of these claims under 35 U.S.C. §102 be withdrawn.

Conclusion:

Applicant believes that this entire application is in condition for allowance and respectfully requests a notice to this effect. If the Examiner has any questions or believes that an interview would further prosecution of this application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: 
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